REMARKS

Claims 1-20 are pending in the current application. In an office action dated November 20, 2007 ("Office Action"), the Examiner withdrew objections to the claims, withdrew objections to the drawings and to the specification in response to previously filed amendments, rejected claims 9-13 under 35 U.S.C. § 101, rejected claims 1-4 under 35 U.S.C. §103(a) as being unpatentable over Yakhini et al., EP 1 162 572 ("Yakhini") in view of Mittal et al., U.S. Patent Application Publication No. 2005/0286764 ("Mittal"), rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Yakhini and Mittal in further view of Lee et al., U.S. Patent Application Publication No. 2004/0202368 ("Lee"), rejected claims 6 and 7 under 35 U.S.C. §103(a) as being unpatentable over Yakhini and Mittal in further view of Bow et al., STIC, Pattern Recognition and Image Processing ("Bow"), rejected claim 8 under 35 U.S.C. §103(a) as being unpatentable over Yakhini, Mittal, Bow, and further in view of Padilla et al., U.S. Patent Application Publication No. 2003/0233197 ("Padilla"), rejected claims 9 and 11 under 35 U.S.C. §103(a) as being unpatentable over Yakhini and Mittal in further view of Gelenbe et al., U.S. Patent No. 5,995,651 ("Gelenbe"), rejected claim 10 under 35 U.S.C. §103(a) as being unpatentable over Yakhini and Mittal in further view of Kondo, U.S. Patent Application Publication No. 2004/0234160 ("Kondo"), rejected claims 12 and 13 under 35 U.S.C. §103(a) as being unpatentable over Yakhini, Mittal, and Gelenbe in further view of Belkin et al., U.S. Patent No. 6,738,087 ("Belkin"), rejected claim 14 under 35 U.S.C. §103(a) as being unpatentable over Yakhini in view of Shames, U.S. Patent No. 6,990,221 ("Shames"), rejected claims 15-17 under 35 U.S.C. §103(a) as being unpatentable over Yakhini and Shames in further view of Mittal, rejected claims 18 and 19 under 35 U.S.C. §103(a) as being unpatentable over Yakhini, Shames, and Mittal in further view of Bow, and rejected claim 20 under 35 U.S.C. §103(a) as being unpatentable over Yakhini, Shames, Mittal, and Bow, in further view of Padilla.

Applicants' representative wishes to thank the Examiner for withdrawing rejections to the claims, drawings, and specification. With respect to the 35 U.S.C. §101 rejections of claims 9-13, Applicants' representative has amended claims 9 and 11, above,

as proposed by the Examiner, and has cancelled claims 10, 12, and 13. Thus, Applicants' representative believes that the 35 U.S.C. § 101 rejections have been fully addressed. Applicants' representative respectfully traverses the 35 U.S.C. §103 rejections of claims 1-20.

The Examiner's rejections are quite lengthy. Applicants' representative appreciates the amount of time that the Examiner must have devoted to writing these rejections. However, in Applicants' representative's respectfully offered opinion, none of the rejections are justified. Rather than write a detailed response to each, separate rejection, Applicants' representative will address the Yakhini and Mittal references, on one or both of which the Examiner relies for all of the 35 U.S.C. §103(a) rejections. Specifically, Applicants' representative focuses the rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Yakhini in view of Mittal, since it is in this rejection that the Examiner provides justification for citing Yakhini and Mittal. In rejecting claim 1, the Examiner states:

> Yakhini et al. disclose a method for classifying pixels of a microarray image (paragraph [001], line 1-2), (the processing region of microarray is read as the same concept as classifying pixels of a microarray) with observed intensities (paragraph [0003], line 2-3) within a region of interest (paragraph [0001], line 1-20), (the indicating of region as read as region of interest), the method comprised in the classifying of pixels in the region of interest (paragraph [0001], line 1-2) as either feature pixels or background pixels based on the intensities of the pixels (paragraph [0001], line 2-4), (the feature of the molecular array is read as feature pixels, and the optical or radiometric signal is read as background pixels); based on pixel locations (paragraph [0005], line 1-8) and intensities (paragraph [0004], line 7-10), and accordingly classifying the pixels as either feature pixels or background pixels (paragraph [0001], line 1-4).

Applicants' representative has not only read Yakhini, but actually drafted the original U.S. Patent Application filed in the European Patent Office as Yakhini. Understanding the contents of Yakhini, Applicants' representative is puzzled by the above-quoted statement in support of the rejection of claim 1. For example, the Examiner cites paragraph [0001] of Yakhini in support of a number of statements, but paragraph [0001] is a very general statement of the subject matter to which Yakhini is

directed. It contains neither the language nor concepts for which the Examiner recites this paragraph. This paragraph states that Yakhini is directed to properly orienting the scanned image of a molecular array in order to extract data from indexed positions within the scanned image of the molecular array. There is no discussion, in this paragraph, of "classifying pixels," "feature pixels as opposed to background pixels," and other language for which the Examiner cites the paragraph.

The Examiner appears to cite language from paragraph [0001] of Yakhini that does not occur in paragraph [0001] of Yakhini. For example, Applicants' representative cannot find the phrases "the processing region of microarray" and "the indicating of region as read." The Examiner's attempts at reading terms, such as "processing," to mean something quite different and unrelated, such as "classifying," or the Examiner's obvious confusion as the difference between a microarray feature and feature pixels, is rather disturbing. As will be discussed in greater detail, below, the Examiner cannot simply redefine terms and phrases arbitrarily, in order to read claims onto unrelated passages of a reference. The Examiner's attempt to equate "optical or radiometric signal" with the claim phrase "background pixels" is nothing short of absurd. Anyone even cursorily familiar with computer science well understands that a pixel is the smallest-granularity region of a displayed image, and is not an optical or radiometric signal.

Had the Examiner more carefully read Yakhini, the Examiner would have discovered far more germane material in latter portions of the specification of Yakhini. For example, paragraphs [0037-0041] of Yakhini discuss blob analysis carried out on regions of interest within the scanned image of a microarray in order to produce a binary map of each region of interest to which blob analysis is applied. Blob analysis assigns to pixels above a threshold intensity value a first binary value, and to pixels below the threshold intensity value a second binary value, thereby producing a binary mask of the region of interest. However, blob analysis, described in the above-cited paragraphs of Yakhini, is carried out ***not to classify pixels within the region of interest as feature pixels or background pixels***, but is instead conducted in order to identify a "blob greater than a threshold size closest to the center of the binary image" in order to compute the

coordinates of the centroid of this blob, and to then use the computed coordinates as "the refined coordinates for the feature" (Yakhini, paragraph [0041]). As explained in Yakhini, Figure 18 of Yakhini shows a circle describing the outer region of interest for a particular feature. As a result of blob analysis, as discussed in Yakhini, the binary blobs shown in Figure 19 are produced. However, these binary blobs do not indicate which pixels are feature pixels and which pixels are background pixels. Had the Examiner carefully read Yakhini, the Examiner would discover that, as shown in Figure 2, Figure 4, Figures 29-32 of Yakhini and as discussed throughout Yakhini, features are assumed to have a disk-like shape, with an inner region of interest having generally high signal intensities surrounded by an outer region of interest, and both the inner and outer regions of interest surrounded by a background region. The blob analysis discussed in Yakhini is concerned only with finding highest-intensity areas within a region of interest in order to compute a refined coordinate for a center of the disk-shaped inner region of interest for a feature, and is not in any way employed in Yakhini to classify pixels as being feature pixels or background pixels.

Nothing in paragraph [0001] of Yakhini mentions or suggests anything at all to do with classifying pixels within a region of interest as either feature pixels or background pixels. Paragraph [0005] of Yakhini discusses the fact that features are generally laid out according to a rectilinear coordinate system, or grid-like abstract lines. Indeed, each feature in a scanned image of a microarray is considered to have a location, or position – namely, the center of the disk-shaped inner region of interest. This paragraph discusses feature positions, not pixel positions or locations, and does not stand for that which the Examiner cites the paragraph. Paragraph [004] of Yakhini discusses, in overview, molecular arrays and scanned images of molecular arrays. Indeed, this paragraph discusses the fact that Yakhini considers features to be disk-shaped regions, and, quite explicitly, discusses the fact that pixel values within the disk-shaped feature do not necessarily have intensity values expected for the feature but, instead, may have intensity values below the expected intensity values of the feature or above the expected intensity values for the feature. ***Clearly, Yakhini does not classify pixels within the scanned image of a microarray as feature pixels or background pixels based on the***

intensities of the pixels. In fact, were the Examiner to carefully read Yakhini, the Examiner would find that Yakhini is directed to finding an optimal set of feature-position coordinates in order to index a scanned image of a microarray, and then to extract feature-signal values from those pixels within an assumed disk-shaped region about the refined coordinates. There is no mention or suggestion in Yakhini of individually classifying pixels within the disk-shaped region of a feature as feature pixels or background pixels. The Examiner may begin reading from paragraph [0063] of Yakhini for understanding this aspect of Yakhini's disclosure.

In summary, while Yakhini does, indeed, generate a binary map of a region of interest, the binary map is generated as part of blob analysis, which is directed to ultimately determining refined coordinates for the center of the disk-shaped region of a feature, and is not in any way used for classifying pixels as feature pixels or background pixels. None of the initial paragraphs of Yakhini, including paragraphs [001], [0004], and [0005] teach, mention, or suggest anything at all with regard to classifying pixels as either feature pixels or background pixels. The Examiner appears to be reading that, which the Examiner wishes to find in Yakhini, from the very general, descriptive paragraphs of Yakhini, none of which even once uses the phrase "classify pixels in the region of interest as either feature pixels or background pixels," or anything related or similar to this phrase. The Examiner is entirely incorrect in citing Yakhini as teaching, disclosing, mentioning, or even suggesting the first step of claim 1.

Applicants' representative is respectfully astonished that the Examiner would cite Mittal as having anything to do with microarray images. Mittal is directed to entirely different and unrelated subject matter. As explicitly stated by Mittal in the abstract, Mittal is directed to: "A method for dynamic scene modeling and change detection applicable to motion analysis [that] utilizes optical flow for capturing and modeling the dynamics of a scene." Applicants' representative trusts that the Examiner understands that microarrays and microarray images have nothing to do with scenes, motion analysis, and the dynamics of a scene. Were the Examiner to read Mittal, the Examiner would discover, in paragraphs [0002-0009], that Mittal is directed to real-time video analysis. Scene dynamics are, in the context of real-time video analysis, objects,

such as vehicles and pedestrians, within a scene captured by real-time video analysis that move with respect to the static portions of a scene. Were the Examiner to read Mittal's brief summary-of-the-invention section, in paragraphs [0010-0029], the Examiner would discover that Mittal clearly and explicitly states that Mittal is directed to predictive methods that attempt to model a visual scene as a time series and to develop a dynamical model to predict the current input based on past observations. One does not even need to be familiar with details of either real-time video analysis or microarrays to appreciate that these two areas have absolutely nothing to do with one another.

In the rejection of claim 1, the Examiner states, without justification, that Mittal is "an analogous environment." There is absolutely nothing disclosed in Mittal that has anything at all to do with microarrays, scanned images of microarrays, intensities of pixels within regions of interest within a microarray or scanned image of a microarray, or anything at all even remotely related to the current invention. The citation of Mittal is, in Applicants' representative's opinion, completely unfounded.

Claims are not interpreted arbitrarily to suit an Examiner's purposes in attempting to craft an unjustified rejection based on an unrelated reference, but are instead interpreted in light of the specification and according to interpretation that would be made by one skilled in the art, as discussed in a variety of Federal Circuit and U.S. Supreme Court decisions The courts have consistently held that language used in a claim must be interpreted according to clear definitions in the specification and, lacking definition in the specification, to the well-known meaning of the phrase to those skilled in art, as for example:

> "Words of a claim 'are generally given their ordinary and customary meaning.'" Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). A patentee, however, can "act as his own lexicographer to specifically define terms of a claim contrary to their ordinary meaning." Chef Am., Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1374 (Fed. Cir. 2004) (citation omitted). "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." Id. "***Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.***" Id. "In determining the meaning of the disputed claim limitation, we look

> principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." See Phillips, 415 F.3d at 1312-17. "***Claims must be read in view of the specification, of which they are a part.***" Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (internal quotations omitted). ***Indeed, the specification is '[u]sually . . . dispositive" and "is the single best guide to the meaning of a disputed term.***" (emphasis added)

Of course, this principle is quite compatible with common sense and reason. Were explanations and definitions of claim terms and phrases required to be included in the claims themselves, the claims would run on for many tens of pages, and would be impossible to parse and interpret.

No one even cursorily familiar with real-time video processing and microarrays would suggest that pixels within a feature region or background of a feature region of a scanned image of a microarray have anything at all to do with the visual background and dynamic objects within a scene captured by a video camera. Mittal is completely unrelated to the subject matter of the current application.

Furthermore, paragraph [0019] cited by the Examiner, apparently as teaching the second element of claim 1, namely "iteratively computing, for pixels within the region of interest, probabilities that the pixels are feature pixels and probabilities that the pixels are background pixels, based on pixel locations and intensities, and accordingly classifying the pixels as either feature pixels or background pixels," does not appear to have anything at all to do with any kind of classification of pixels, let alone classifying pixels as belonging to the feature regions or background regions of the scanned image of a microarray. Paragraph [0019] states:

> In accordance with another aspect of the invention, a method for scene modeling and change detection in an image, comprises the steps of: computing optical flow for the image; performing an invariant transformation such that image pixel intensity is transformed and evaluated in an illumination-invariant space; forming a background model in a high-dimensional space; utilizing results of the computing optical flow and of the invariant transformation as features in the background model; utilizing the background model to estimate probability for a current input to belong to the background; providing a first and a second indication whenever the probability is respectively

> above and below a given threshold; adding the current input to the image background model when the probability is above the threshold; adding the current input to the image background model with a low probability whenever the probability is below the threshold; and performing morphological operations on the pixel-level detection for outputting detection.

There is not a single mention of background pixels or feature pixels in this passage. There is no mention of iteratively computing anything at all in this passage. There is no mention of a "region of interest" of a scanned image of a microarray in this passage. There is no mention of computing "probabilities that the pixels are feature pixels and probabilities that the pixels are background pixels" in this passage. As anyone even cursorily familiar with image processing would easily recognize, the term "background" in the cited passage of Mittal cites to the background of, or static objects within, a visual scene captured by a video-recording method. As anyone even cursorily familiar with computer science, in general, would well understand, optical flow, illumination-invariant spaces, and other such concepts discussed in paragraph [0019] of Mittal relate to visual-image processing of recorded, real-world scenes, and have absolutely nothing to do with data analysis of data encoded in the scanned image of a microarray. The canned image of a microarray is a completely static image. There are generally no moving objects on the surface of a microarray that is being scanned, except perhaps for floating dust particles or an occasional bacterium, neither of which can be imaged. Furthermore, a microarray scanner captures a single image. or perhaps a few images, of a microarray, but does not capture a video-image of a microarray surface. The probability "for a current input to belong to the background" referred to in paragraph [0019] of Mittal has to do with assigning a visually recorded object to the background of a visual image, and has nothing at all to do with feature versus background pixels in the scanned image of a microarray. In short, anyone familiar with computer science, image processing, and microarrays, and probably anyone with even a first-year undergraduate background in computer science, would easily recognize that Mittal is directed to background modeling and subtraction as a core component of motion analysis and automated interpretation of real-time video used in a variety of applications, including industrial automation, transportation, automotive, security and surveillance, and communications (Mittal, paragraphs [002-0003]). Those

familiar with the English language will appreciate that words such as "background," "feature," "region," and "interest" have more than one meaning, and can be applied to a variety of different concepts. Patent law well recognizes the ambiguity in natural languages, and therefore requires that claims be interpreted according to the teachings of the specification and according to how the claim language would be interpreted by one skilled in the art. To suggest that the background of a visual image, namely the static portions of a video image captured in real-time video, has anything at all to do with the background pixels of the scanned image of a microarray, defies the very core and basic principals of claim interpretation, a rudimentary understanding of computer science, image processing, and microarrays, and common sense and reason.

Clearly, Yakhini and Mittal do not teach, mention, or even suggest that for which they are cited by the Examiner. All of the 35 U.S.C. §103(a) rejections of claims 1-20 depend principally on either Yakhini or a combination of Yakhini and Mittal. Therefore, none of the 35 U.S.C. §103(a) rejections of claims 1-20 are justified or proper, since neither Yakhini, nor Mittal, nor Yakhini and Mittal, in combination, teach even a single element of independent claim 1 or independent claim 14, and therefore cannot possibly make obvious independent claim 1, independent claim 14, or any claim that depends from independent claims 1 and 14. As the Examiner hopefully appreciates, a combination of references must teach or suggest each and every claim limitation in order to serve as the basis for a 35 U.S.C. §103(a) rejection.

In Applicants' representative's opinion, all of the claims remaining in the current application are clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,
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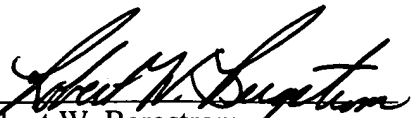

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